

INJURIES, ANTLERS, AND INJURED ANTLERS

BY JIM HEFFELFINGER

Oddly shaped antlers and deviant racks are always more interesting than the standard typical configurations. Many theories about the causes of nontypicals are offered up to explain the unusual things we see from time to time. On a recent internet discussion forum, I read with interest as someone slammed a hunting guide for saying that a buck's ankle injury caused its misshapen antlers. I didn't have the time to intervene in his defense, but he was probably right in his assumption.

Because of our interest in nontypical antlers, much research has been directed at the causes of antler abnormalities. There are many different factors that can cause or affect the expression of odd antlers. We know some non-typical traits are genetic and show up repeatedly in a buck's sons and grandsons. Interestingly, a genetic antler trait can also show up in the male offspring of a certain doe that comes from a line of nontypical bucks. Besides genetics, other things like disease, nutrition, parasites, age, hormones, and injuries can disrupt the growth of the normal, species-specific shape in antlers.

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JIM HEFFELFINGER PHOTO

Double beams are usually the result of damage to the antler pedicle (base). Research shows that the outside (lateral) portion of the antler pedicle is most likely to cause double beams.



TONY CAMPBELL PHOTO



Injuries to the eye orbit will frequently cause the growth of antler material as illustrated by this buck that injured his eye and the skull and grew a spectacular tine at that location. This adds new meaning to the old saying "A trophy is in the eye of the beholder."

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Injuries probably account for most of the very freakish deer heads. Physical injury or trauma to either the growing velvet antlers, skull, or a major skeletal structure can result in antler abnormalities. Each type of injury has a different effect on antler growth and knowing more about these processes will allow you to do a better job formulating theories and acting smart around your deer lease.

INJURY TO THE ANTLER

Obviously, serious breaks to the antler tines or beams are going to cause the rack to be misshapen. In cases where this happens while the antler is still growing, it may stay attached to the rack and re-fuse with it leaving a pendulous, or hanging, tine that frequently has a large rounded tip. These bulbous and usually dark tips are from the pooling of blood at the bottom on the broken tine.

Any injury to the velvet antler may damage the growing cartilage-like structure and affect the blood flow and hence the deposition of the protein matrix and later calcium and phosphates. "Acorn points" are a common oddity we frequently see each fall. This is a swelling in the hardened antler tine. Acorn points are caused when the buck bumps the growing tip of the tine on something

hard. The velvet on the actively growing tip is injured and in the process of repairing itself, deposits more material at that location.

Nicks and cuts in the velvet antlers can produce extra points and oddities. This has led some to suggest that the awe-inspiring double drop tine might be caused by bucks trying to slip through a fence and getting the underside of their mainbeams caught (and nicked) on a fence strand. This is an interesting observation, however, drop tines seem to be mostly of a genetic origin.

Game keepers in early Europe reportedly would jumpshoot red deer in the summer to shoot their velvet antlers full of bird shot. The intent was not to kill the deer, but to pepper the growing antlers with lead pellets to cause nontypical points to proliferate. Much later, a researcher tested this by implanting small iron balls in growing antlers and found that it did, indeed, produce extra points. Likewise, parasites such as ticks on velvet antlers can, in some cases, cause malformed antlers if they disturb the velvet enough.

The disruption of blood flow is not the only cause for unusual antler growth, however, as the living velvet is full of nerves. Bucks in velvet do a pretty good job of protecting their antlers because they are sensitive during that phase of the antler cycle. Those working with captive deer know that bucks do not like their velvet

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"Acorn points" occur when the tip of the antler tine is damaged while growing so that after growth resumes a swollen portion remains from the repair and regrowth.

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antlers touched. These nerves not only make the antlers sensitive, but we know that nerves are very important to the development of the species-specific antler shape. In the 1940s, pioneering antler researcher George Wislocki cut the trigeminal nerve to the antlers and found that they did not grow the correct shape and the deer were not careful and damaged the antlers by hitting them on objects.

Researchers once attached a human pacemaker to a set of growing whitetail antlers and found the electrical stimulation caused the antlers to grow in a bizarre shape — almost a mirror image of a normal whitetail rack (which the buck had the year before). To everyone's surprise, this buck grew the same kind of bizarre antler shape the next year even without the electrical stimulation. This started famed antler researchers Anthony and George Bubenik thinking about the role of nerves in antler development.

The Bubenik's noticed many odd things in their captive research herd. For one, bucks that injured one side of their growing antler sometimes developed odd growth patterns on both sides. How was the injury on the right side communicated to the left side? Also, antlers that were injured during growth not only produced an abnormal growth at that location, but they frequently reproduced that growth even larger on the next 1 to 2 sets of antlers. Since the antlers were shed and regrown, how could that non-typical point be reproduced on future sets of antlers? Interestingly, antler damage that occurred while the animal was sedated did to produce as great of a

response in antler growth. These occurrences led the Bubeniks to hypothesize that the nerves in the antlers were communicating with the central nervous system and this information has to be stored somewhere in the body.

In the late 1950s, Richard Goss (author of the book *Deer Antlers*) began a study where he amputated different parts of the growing antler and pedicle and recorded the effects on antler growth. He found that cutting 1 inch off the tip of the growing antler effectively stopped all further growth that year. When the growing antler is only one inch tall, slicing through the antler bud front to back produced a double beam in the Sika deer he was studying.

INJURY TO THE PEDICLE

Injury to the pedicle (base) itself nearly always causes abnormalities, but again the severity of the affect depends on what part is injured. Extensive trauma to the pedicle before growth begins or soon after is the source for many large freakish racks.

If one pedicle is injured severely, that side or both sides will be malformed during the next antler cycle. Goss also tested the effects of trauma by experimentally cutting away different parts of the pedicle, always experimenting on the left side and leaving the right side alone for comparison.

When the front half, back half, and inside half of the pedicle was surgically removed, the deer was able to grow

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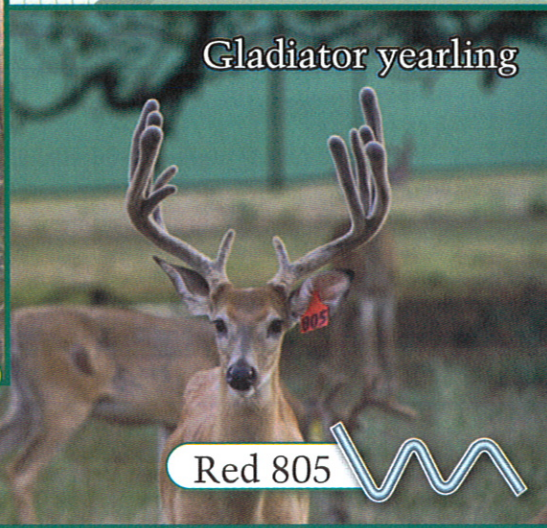
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Injuries to the eye orbit frequently induce antler growth from the location of the injury.

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the skin of the frontal bone. This resulted in female red deer growing antlers, with the size of the antlers proportionate to the amount injected.

INJURY TO THE BODY

Besides direct trauma to the growing antlers, pedicles, or skulls, injuries to the buck's body can also cause antler abnormalities. Injury to a large skeletal structure such as a broken leg bone often causes a misshapen rack the next antler cycle. This has been documented in mule deer, whitetail, sambar deer, elk, and muntjacs (barking deer).

Biologists from Texas Parks & Wildlife Department started noticing that deer observed in the field with leg injuries had a high frequency of abnormal antlers. They recorded 32 bucks killed by hunters with abnormal antlers and 22 (69%) had an injured leg. In the late 1960s, researchers amputated the lower portion of the rear legs of 4 whitetails and found that all of them developed misshapen antlers on the opposite side. The same thing happened when the leg of a Sambar deer had to be amputated due to an injury and for the next 5 years he grew a very small antler on the opposite side of the

amputation. Interestingly, it is almost always the antlers on the opposite side ("contralateral") of the leg injury that is misshapen.

Leslie Robinette kept detailed and meticulous records while researching mule deer in Utah in the 1950s. He recorded 9 deer with hind leg injuries and 7 of these had oddly shaped antlers on the opposite side, while one was on the same side and another misshapen on both sides. Of the 8 deer with front leg injuries, 6 had their racks messed up on the opposite side and the remaining 2 were not normal on both sides. In total, of the 17 deer with leg injuries, 13 (76%) could not grow normal antlers on the opposite side.

There has not been a lot of research on this topic for obvious reasons (researchers are reluctant to go chopping legs off their research deer!). However, the evidence seems to indicate that skeletal injuries nearly always cause abnormal antlers on the opposite side.

The cause of this contralateral effect is not known but many theories have been set forth. Some have postulated that while still in velvet, the buck frequently turns to lick the injured leg thereby repeatedly injuring the opposite side of the rack on nearby brush. This seems unlikely

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because of the care bucks take to protect their growing antlers and the fact that the opposite antler is usually not deformed from repeated trauma, just under-developed.

Another theory is that the uneven rack counter-balances the injured leg and allows the animal to move around a more comfortably. This would be difficult to prove in any conclusive manner, but it seems like it would be more advantageous to have the antler on the same side lighter to take weight off the injured leg.

It has been known for some time that the left side of the brain controls the muscles on the right side of the body. No one knows why our nervous system is cross-wired this way, but it is. Perhaps that makes it less surprising that trauma to one side of the body affects nerves (and, in turn, antler shape) in the other side of the head. Some have written this off to coincidence, however, there is simply too much evidence from several species of deer showing this contralateral effect is real.

When talking about body injuries there is probably none more traumatic than castration.

Bucks that are castrated while in the hardened antler stage will drop their antlers within a few weeks because of the sharply falling testosterone level. Bucks castrated

after they drop their hardened antlers, will grow new antlers the next year, but they will never be polished or shed because of the lack of sufficient hormone levels. While this body injury is really not skeletal in nature, some think cactus bucks are caused from bucks castrating themselves while jumping over a fence. I am quite sure that, like antlers, this part of the buck's anatomy has a high density of nerves and a buck is surely more careful than that. Cactus bucks are most commonly a hormonal problem.

FRANKEN-TINE

There are many possible causes of antler abnormalities, but injuries probably account for the strangest monsters. Oddities and freaks are normally not tolerated by nature; natural selection quickly removes them from the gene pool. However, an enormous nontypical freak may not be at a disadvantage when it comes to battling for dominance. Early in the spring antler growing season when the buck "pecking order" is worked out, other members of the bachelor group would give a large, monstrous "Franken-tine" buck a very wide berth. ❧❧

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